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New Species and Varieties of Geometridae.

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Some months since I began the study of the *Geometridæ* of N. A., having more particularly in view a looking into the systematic arrangement of genera and species. With this object, in addition to my own collection, I have obtained for my use, wholly or in part as I have desired, the collections of the Lepidopterists in the vicinity of New York, as well as of many others from other parts of our country. Many of these are especially rich from the collecting of Messrs. Hy. Edwards, Morrison and Doll, and variations from normal forms are largely represented. So far my study has been in the *Ennomineæ* only. My conclusions as to genera I will probably not give until the whole family has been studied. In the material at hand, I have found as they seem to me the following new species and varieties. The generic references are to be regarded as provisional. These descriptions may be followed by brief notes on already named species.

1. *Oxydia zonulata* sp. nov. Expands 46 mm. Head and antennæ pale ochreous, the vertex, anterior edge of hind wings and abdomen shading somewhat lighter. Wings otherwise a pale yellow ochreous. T.a. line wanting. T.p. line present on both wings, reflected on fore wings near apex towards costa at an acute angle, and somewhat curved inwardly in its course across the fore wing; straight on hind wing. Its color is buff on fore wing, tawny on hind wing. There is a small smoky spot near anal angle. Beneath very light ochreous, without lines but with two or three shadings near apex.

The above is close to *O. mundata* Guen. but lacks the shadings on the wings above, the cross line is not extended to the apex, and the fore

wings are considerably more bent downward at apex. 1 ♂. Texas. Coll. Meyer.

2. *Ripula virginaria* sp. nov. Expands 44 mm. Palpi brown tawny. Thorax, abdomen and wings pure white. The fore wings have a triangular spot near apex, black outwardly, reddish and olive otherwise, and another narrow olive spot near anal angle. On the hind wing is a divided olive band faint anteriorly, wavy on both sides, inwardly forming with the inclosed wing space a continuous waved white line. Beneath pure white. Fore and middle legs tawny, hind legs white.

1 ♂. Florida. Coll. Hy. Edwards. Very near to *R. mexicaria* Guen. but it differs in design of markings on wings, and in the color of the legs.

3. *Eutrappela anfractata* sp. nov. Expands 40 mm. Head, thorax, abdomen and ground color of wings, of an even light pearl gray. Wings with two darkish lines, the basal sinuous, curved outward, faint and on fore wings only; the outer slightly waved, straight however in its general direction, reflected near apex at an angle more obtuse than is usual, and with the reflected part not straight but curved outwardly to costa. The outer lines are edged with whitish outwardly, and shade gradually and broadly into the ground color. There is a broad submarginal fawn shading also. Discal spot distinct. Beneath light even gray, sometimes with an ochry shade. Lines wanting or outer lines very faintly perceptible.

2 ♂, 1 ♀. Ariz: Coll. Hy. Edwards, Hulst. Nearest *nubilata* Pack. and *catenulata* Grt. It is quite possible that all are variations of one species, *anfractata* being the Arizona form and *catenulata* the form having the median space fawn brown, darker than the rest of the wing.

4. *Tetracis mellitularia* sp. nov. Expand 35-45 mm.

This is the species described by Packard, *Geom. Moths* p. 551 and figured plate XIII, f. 43, and called *T. paralleliaria*. The description and figure are of one of the darker specimens. The original description by Packard of *T. paralleliaria*, *Bost. Pro. Nat. Hist. Vol. XVI*, p. 38, is very brief, simply, "lighter than *T. truxaliata*. A fresh specimen from Mr. Behrens is ochreous." The specimen labelled "type" in the Museum of Comp. Zool. Cambridge, Mass., is probably the fresh specimen referred to, and is the insect figured plate XIII, f. 42. But this is not the same species with fig. 43 but is another, found commonly in Colorado and less so in Arizona and California and which varies from reddish ochreous to light ochreous. To attach the name of Packard to the one species we have what there is of the original description, the type specimen, and the fig. 42, pl. XIII. To attach it to the species I call *mellitularia* we have the description given in *Geom. Moths*, p. 551, and fig. 43, pl. XIII. The name it seems to me must go with the original description and the type. *T. paralleliaria* Pack. as thus determined, was afterwards named *Eurymene excelsa* by Mr. Strecker, *Report Explor. and Surv. Dept. of Missouri*, Ruffner, 1878, p. 1863, pl. 2, f. 9. And a

lighter form, more common in Ariz., was described by Mr. Grote, Can. Ent. Vol. XV, p. 27, and called *T. simpliciaris*. Mr. Grote's *T. obientarii* (which must be *T. oblentata*) is close in appearance, but the cross lines are much wider apart, the antennæ of the ♂ are simple and the palpi very much less prominent. I have both his types before me for comparison. 5 ♂, 3 ♀. Ariz., Nev., Cal.: Coll. Hy. Edwards, Tepper, Hulst.

5. *Tetracis cavillaria* sp. nov. Expands 41 mm. Head, body and wings of a dull light ochreous fawn color. The outer part of the wings with the color a little more decided, and over all a faint flesh colored flush. Lines faint, the t.a. nearly straight, the t.p. nearer median than usual, present on both wings, dull fawn. Another line beyond, faint, reaching from costa half way across fore wing. Beneath as above, somewhat lighter. Antennæ in ♂ rather shorter and pectinations more lengthy than usual. Fore wings slightly, hind wings very slightly angulated. 1 ♂. Ariz.: Coll. Hulst.

6. *Tetracis morsicaria* sp. nov. Expands 37 mm. Head, thorax and abdomen light ochreous, lines dark fawn edged t.a. line inwardly, t.p. line outwardly with white. T.a. line straight, reaching twice as far out on costa as on inner margin. T.p. line oblique, starting from costa just within apex. Hind wings very light ochreous outwardly, nearly white inwardly. Beneath lighter than above, t.p. line alone indistinctly evident. Margins of fore wings not falcate, but waved, fringes red.

1 ♀. Texas. Coll. Hulst. Very like in appearance to *T. parallelaria* var. *simpliciaris*, but the fore wings are much more extended, both lines, especially the outer, more oblique. The outer margin of the fore wing is much less falcate and angulated, and the margin itself is wavy and edged with reddish.

7. *Tetracis trianguliferaria* Pack. var. *notataria* var. nov.

This variety differs from the type form in having just within the posterior angle of the fore wings a dark brown spot, reaching from the inner border to vein 4. It is undoubtedly a part of a band corresponding with that of *T. coloradaria* Grt. and Rob., but not connected with the outer costal spot.

8. *Tetracis edwardsata* Sp. nov. Expands 35 mm. Head, antennæ, thorax and abdomen cream white. Fore wings a light yellow ochre, crossed with a dark tawny band which is edged on both sides with white shading into the ground color. The band is broad at costa embracing one-third of the wing and reaching nearly to apex, then narrowing runs with nearly parallel sides first outwardly, then inwardly, and finally widens rapidly to inner margin. The outer margin of the wing is slightly darker than the ground color. Hind wings very light in color, a little clouded outwardly, without band, and very slightly angulated at the middle. Fore wings angulated, and slightly falcate. Beneath very light cinereous, satiny, unicolorous.

1 ♀ Siskayou Co., Cal.: Coll. of Hy. Edwards in whose honor it is named.

9. *Tetracis geniculata* sp. nov. Expands 30 mm. Head, thorax and abdomen light ochreous. Fore wings of the same color, hind wings lighter. Apex of fore wings rectangular. Median angle on all wings obtuse. Two lines on fore wings reddish brown, the inner angulated below costa, edged outwardly with whitish, the outer reflected near costa at a right angle, continued across hind wings, and edged outwardly its whole length with whitish. Discal spots minute, black. Beneath lighter, except on costal half of fore wings. Outer line partly evident on fore wings only.

1 ♂, Col.: Coll. Hulst.

10. *Metanema novellata* sp. nov. Expands 36 mm. Wings uniform light yellow ochraceous. Two lines on fore wings, the outer continued on hind wings, buff, straight, more distinct than usual. The hind wings have a brown hair line, sometimes very faint, in the submarginal space. Fore wings acute at apex, strongly falcate, median angle rather strong, as also on hind wings. Beneath even glistening light cinereous, the ordinary lines faint but the brown submarginal hair line present on all wings. Discal spots, black points above and below.

1 ♂, 1 ♀. Coll. Tepper, Neumoegen. The wings of this species approach in appearance *Metanema quercivoraria* Guen.

11. *Metanema argillaria* sp. nov. Expands 34 mm. Head, antennae, thorax and abdomen light fawn, each segment of the latter edged with a line of lighter color. Wings of uniform light fawn, formed by a clay ground color, heavily striated and powdered with fawn. T.a. line on fore wings brown, fine, sinuous, rounded outwardly. T.p. line brown, edged outwardly with clay white, common to both wings, and reflected on fore wing near apex to costa. Discal spots on fore wings distinct, black. The fore wings are falcate without darker color in curve, the median angle not so projected as in the rest of the genus. Angle of the hind wings dentate, strong. Beneath, dull light ochreous, striated with fawn. Outer line apparent only on fore wings, rather broader and more indistinct, fawn colored and rounded not angulated to costa.

1 ♂ Arizona. Coll. Neumoegen.

12. *Caberodes confusaria* var. *mimaria* var. nov. Expands 42 mm. Lines as in *confusaria* but with basal and outer space tawny, and median space yellow. Also a row of submarginal clouded spots.

1 ♀ Georgia. Coll. Hy. Edwards.

13. *Caberodes galbanaria* Sp. nov. Expands 35 mm. Fore wings a light yellow ochreous with outer third of both wings of a light pink brown. A faint white t.p. line passing through this, on both wings from apex of fore wings. Fore wings with apex produced, pointed, strongly falcate and angled. Hind wings angulated, outer edge of wings straight to point of angle, not rounded. Discal spots on all wings black. Beneath, light pinkish brown, somewhat more pronounced on anterior two thirds of fore wings. Discal spot as above.

1 ♀ Arizona. Coll. Hulst.

14. *Drepanodes effascinaris* sp. nov. Expands 42 mm. Head, thorax and abdomen ochreous. Fore wings pointed at apex, not excavated beneath, but strongly falcate and angulate. Hind wings rounded. T.a. line on fore wings reddish brown, rounding outwardly, and biangulate externally. T.p. line reddish brown, edged outwardly with light ochreous reaching from apex in a straight line across both wings.

Fore wings within t.a. line and both wings beyond t.p. line, reddish brown. The median space varies from clouded to bright yellow. Submarginal clouded spots sometimes apparent. Discal spots small, black. Beneath, outer line more faint on both wings. Color yellowish, with more or less buff, darker beyond t.p. line. Discal spots as above.

2 ♀ S. C. and Fla.: Coll. Neunmoegen and Tepper. The largest of our *Drepanodes*, and allied to *D. panamaria* Pack.

15. *Drepanodes hortularia* sp. nov. Expands 26 mm. Head, antennae, body and wings ochreous buff with median space somewhat darker. T.a. line present on both wings, very nearly median, bending outward, somewhat zig-zag. T.p. line present on both wings, slight; on fore wings oblique, flexuous, and rounded to costa near apex. The ♀ has on hind wings two submarginal rows of small black spots arranged parallel with outer margin. Beneath, color as above, or a little lighter, slightly speckled with black. Lines obsolete or outer one indistinct. Rows of black spots repeated on hind wings of ♀.

1 ♂, 1 ♀ N. J. and Fla.: Coll. Hulst.

16. *Drepanodes perizomaria* sp. nov. Expands 36 mm. Plain, uniform, very even fulvous, with a decided lilaceous tinge. T.p. line only present, white in ♂, dark brown edged slightly with white outwardly in ♀, oblique reflected at a sharp angle, very near apex to costa. Discal spots minute, black. Fore wing pointed, falcate in ♂, pointed, strongly falcate and excurvated in ♀. Apex of fore wings in ♀ black. Beneath more of a buff color with lilaceous tinge lost, speckled with black dots. Lines indistinct.

1 ♂, 2 ♀ Va. Mon. Ariz.: Coll. Graef, Doll, Hulst. Considerably larger than heretofore named species, though in the ♂ somewhat resembling some forms of *D. puberaria*, Grt.

17. *Azelina hubnerata* var. *atrocolorata* var. nov. A form of *hubnerata* in which the basal and median space is smoky black, becoming deep black as it merges in the deep black t.p. line. T.a. line evident near costa, deep black. Hind wings on median and basal spaces lighter. Outer space of all wings cinereous, with more or less of dark striations, giving a smoky appearance. Beneath, smoky cinereous, tinged with lilac.

7 specimens U. S.: Coll. Tepper, Hill, Neunmoegen, Hulst.

18. *Azelina australata* sp. nov. Expands 40 mm. Head, thorax and abdomen russet, thorax darker posteriorly, and a dark line on each abdominal segment above. The wings are crossed by three distinct somewhat heavy black lines; the first basal, straight; the second submedian, slightly angulated outwardly at middle; the third extra discal, wavy and with a large sinus outwardly just above middle. Between the first and second is a slight clouded indistinct line. Between the second and third are two black hair lines, the inner parallel to the second, the outer parallel to the third line. Beyond the third, the space is clouded with irregular and broken dark bands. There is a zig-zag submarginal white line, and at the middle a marginal whitish rectangular spot. The wings are clay white in the median space, darker beyond the hair lines, and smoky ochreous beyond, the colors being limited by the lines. All the wings are rounded, unangulated. The hind wings are brown with a median black line, the submarginal space dull black, and the margin much lighter

including 3 or 4 black points near anal angle. Beneath all wings ochrey yellow at base, a median black line angulated outwardly near middle, then a parallel band of white, then a broad black band broken outwardly, then a marginal white band. Discal spots prominent, black. The insect beneath has something of a *Catocala* appearance.

1 ♂ Fla : Coll. Hy Edwards.

19. *Azelina radiosaria* sp. nov. Expands 35 mm. Palpi, thorax and abdomen a very light ochre. Vertex white. Antennæ of ♂ pectinated for half their length. Fore wings acute at apex, falcate waved on outer margin. Hind wings with a slight projection at middle of margin. T.a. line present on fore wings, straight, white. T.p. line curved, nearly parallel with outer margin, extended faintly across hind wing. T.a. line outwardly, t.p. line inwardly, on both wings edged with brown. Color of fore wings light ochre, but within t.p. line having a distinct pink shading, becoming fainter towards base. Hind wings very light ochreous. Beneath, lighter and more uniform than above, the outer brown shading being apparent on both wings. Discal spots diffuse but distinct.

2 ♂, 1 ♀ Ariz.: Coll. Graef, Doll, Hulst. Nearest to *A. salissaria*, Wlk.

20. *Endropia bilinearia* Pack. var. *mollisaria* var. nov.

The type form from the East is dark brown, with all wings strongly dentated. The variety is the form, almost the only form, found west of the plains, and is of a dull yellow ochreous color, with wings not nearly so dentate.

21. *Endropia bilinearia* Pack. var. *minoraria* var. nov.

A form of a dull yellow ochreous color, very much smaller than the ordinary type form, with black submarginal spots and cloudings on fore wings, and with all wings entirely without dentations or angulations, or these showing but slightly.

I can hardly make myself believe this is not a valid species. It is uniformly only about one-half to two-thirds the expanse of *bilinearia*, and the wings are altogether differently shaped. But the lines are exactly the same and while not common, intergrades in both size and form are before me.

22. *Endropia hilumaria* sp. nov. Expands 40 mm. Of the general appearance of *E. warneraria* Harv. Thorax, abdomen, base and along costa of fore wings fawn. T.a. line indistinct, hardly reaching inner margin. Median space dark fawn with a cloud along costa and a light fawn space just beyond reaching along costa to t.p. line. T.p. line reflected near costa at a rounded angle, sinuous with a large inner band at middle of wing, and another at inner margin, lined outwardly with white. Space beyond light fawn, with an undulating indistinct submarginal white band clearest towards apical space, forming there a crescent. Two dark spots in submarginal space near middle. Wings pointed, falcate. Hind wings fawn to t.p. line, light fawn beyond, outer edge undulating, t.p. line nearly straight. Beneath, ochraceous

fawn, striated; t.p. lines quite distinct, quite straight on fore wings, apical white crescent distinct as above.

2 ♂ Colorado. Coll. Graef, Tepper.

23. *Endropia occantaria* sp. nov. Expands 46 mm. Head, thorax, abdomen, and wings of a light clay fawn color, the median space being somewhat lighter. A faint lilaceous tinge over the wings a little more apparent beyond t.p. line. Fine scattered striations of dark fawn over the wings. A blurred submarginal clouding, obsolete near middle. A whitish apical spot. Lines fine, reddish, somewhat rounded. Wings broader than usual, dentate at the end of each vein. Beneath, color a little lighter. Striations and t.p. lines more pronounced. Some orange ochreous shadings present.

2 ♀ Nev.: Coll. Graef, Tepper. Apparently nearest *E. bilinearia*, Pack., of which it may be a distant variety.

24. *Endropia decoloraria* sp. nov. Expands 28 mm. Head, body and ground color of wings fawn brown, with a faint lilaceous shade. Wings with a dark brown extra median band. This band is strongly sinuous, having especially a large sinus outward, just beyond discal space. Within this band some coarse ochreous striations forming somewhat of a band, also a narrow indistinct submarginal band of the same color formed in the same way. Fore wings nearly rectangular at apex with dark brown edge beneath apex, outer margin sinuous, not dentate nor angulate, swollen out at middle and somewhat bent inwardly close to outer angle, where there is a small spot of dark brown. Hind wings obtusely dentate with large double tooth near middle, and another single tooth near outer angle, with a deep sinus between. Beneath as above, without the darker bands and spots.

2 ♂ Coll. Graef and Tepper. No locality with either specimen.

This is nearest the insect represented by Dr. Packard as a var. of *End. armataria* H. Sch. (Geom. Moths, p. 511, Plate XII, f. 20.) Dr. Packard speaks of the wings being the same as in *armataria* though not so represented in the figure, and there they are not so diverse as in *decoloraria*. It differs from *armataria* in the entire difference of color of wings and shape of bands above and below, has no suggestion of the very marked and brilliant appearance of *armataria* below, and there is an entire difference in the shape of both wings.

25. *Endropia lentaria* sp. nov. Expands 32 mm. Palpi dark drab. Antennæ and abdomen drab. Thorax and wings to t.p. line reddish ochreous. Beyond, the color varies from cinereous to dark brown. T.p. line on both wings, nearly straight on front wings reaching costa considerably within apex, reddish brown, edged outwardly with a narrow white line. Fringes dark brown. T.a. line faintly evident on fore wings. Discal spots distinct, annulate on fore wings, faint on hind wings. Beneath a dull reddish brown irrorated with dark brown, much darker beyond t.p. line. The lines are faintly evident, discal spots distinct. All wings rounded without angles or dentations.

4 ♂ Fla.: Coll. Neumoegen, Doll, Hulst.

26. *Endropia manubiaria* sp. nov. Expands 44 mm. Very much as in *E. serrataria* Dru., but with a single angle to each wing with the space beyond the t.p.

line either as light as median space or slightly darker; with no inner line to hind wings and with a looped hair line outwardly from t.p. line. Beneath, as above, but with lines somewhat more distinct.

2 ♂, 1 ♀ Colorado. Coll. Tepper, Hulst.

27. *Ellopia somniaria* sp. nov. Expands 44 mm.

This is a form from N. W. U. S and Brit. Columbia which Packard (Geom. Moths p. 494) does not separate from *E. fervidaria*. On comparing 28 specimens of *fervidaria* with 10 of *somniaria* I find no intergrading, and I see no reason why *somniaria* should not be considered a good species. It is larger, somewhat more yellowish, the dark speckles larger and more evenly distributed; the cross lines are broader and more distinct, the outer ones broadly edged outwardly and the inner ones inwardly with orange.

8 ♂, 2 ♀ Or. W. T., Van, I : Coll. Graef, Tepper, Neumoegen, Hulst.

28. *Eurymene arrogaria* sp. nov. Expands 34 mm. Very much like *E. fervidaria* H. S. and *E. phlogosaria* Guen., but without striations or cross lines. The outer cross line is faintly suggested by the outer shadings, but so far as suggested is not straight, but rounded outwardly. Basal and median space ochreous fawn, outer space fawn with brown cloud at inner angle. Hind wings ochreous yellow, with dark brown or black cloud at anal angle, this in part being the beginning of the t.p. line. Discal spots prominent on fore wings. Beneath, orange yellow on costal half of fore wing from base to outer third, light yellow on posterior half. Outwardly orange to turn of wing on outer margin. The space at inner angle, the outer third of hind wings, and all fringes vary from flesh color to lilaceous. Basal and median portions of hind wings orange yellow, striated with orange. Discal spot on fore wings somewhat blurred.

3 ♂, 2 ♀ Eastern States. Coll. Graef, Tepper, Neumoegen, Hulst.

29. *Rumia ochrearia* var. *unicoloraria* var. nov.

Differs from the type form in being of a clear bright yellow, without any markings whatever.

30. *Angerona crocataria* Fab. var. *caelaria* var. nov.

This variety differs from the type form in having the brown spots and markings quite obsolete and having the spots near outer angle of a pale white, faintly edged with brown.
